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ABSTRACT

The first of thirteen units suggested for an environmental education curriculum is presented in this teacher's guide. The collection of units for grades K-12 was written in response to a mandate from the Minnesota State Legislature through a bill making provisions for developing and implementing a state-wide environmental education program. The units are experimental in nature and are not oriented as to subject matter or academic discipline. The kindergarten unit, "Recognizing Associations", strives to make children become aware of the associations between a symbol and an event in order to predict an appropriate outcome. To do this the skills of reasoning and observation are stressed, with experimentation used only to help pupils realize it is necessary to pay close attention to procedure in order to make valid predictions. The activities are designed to provide experiences in comparing and contrasting, duplicating structures, and predicting outcomes. A list of materials needed precedes each activity. Although written for a specific grade, the unit can be adapted for any level or situation. (BL)

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CONTENTS

Introduction..... 2

Background Information..... 4

Suggested Procedure

Duplicating Structures..... 7

Duplicating Colors.....12

Fish Responses.....18

Magnets.....23

Comparing Numbers of Boys and Girls.....27

Other Suggestions.....31

Nature Hunt.....33

Outdoor Field Trips.....42

To The Reader:

The following unit of instruction-suggestions is part of a sample collection of units for grades K-12. The sample collection was written in response to a mandate from the Minnesota State Legislature--Section 1. Minnesota Statutes 1967, Chapter 126, Amendment 126.111 (March 1969).

This bill made provisions for developing and implementing a statewide Environmental Education Program.

Thirteen units have been developed. They are experimental and need to be evaluated by teachers. New methods, new activities and a new area of awareness are being suggested. The reader must be aware that these units for instruction are not "subject matter" or "academic discipline" oriented. The question cannot be asked whether a unit should be taught during a language period, a social studies period or math time. Instead, ask this question when deciding where and when to use a unit: "Is this unit a real-life experience of concern to the students?" If the answer is "yes," then students should respond positively and the unit will turn out to be environmental education. Environmental education is real-world involvement.

One of the best evaluations of the success of these suggestions for increasing student understanding (and your success of getting across to the students) is the application of learning that students make.

But we shouldn't wait until the students graduate before we look at application of learning. The main reason not to wait is that students need to have some guided practice in application as well as practice in interpreting what is going on in the world.

These units are isolated samples of environmental investigation. The user must understand that each investigation needs to be tied to a real local concern. And further, that each investigation needs to be applied to constructively resolving or implementing that concern--no matter how small. Local concerns may be as grand as a community movement to influence local highway building, or as small as subtly manipulating the traffic pattern of students leaving a classroom.

Quality of student involvement and application of understanding can often be evaluated best through the experienced teacher's interpretation of what parents and the community say about what the students do and say. There is no objective, multiple-choice test which will evaluate a student's success at working with others to resolve a problem of living in an environment. But evaluation can come from observation by someone who has already gained experience in wise living. It is humbly hoped that this unit contains

suggestions which allow students to practice wise living.

Through this same sense of evaluation, it is also the teacher who is best able to choose the appropriate experience or investigation to educate his students. This unit was aimed at a specific grade level when it was developed but there is no rule which says it will not work for any level or any situation K through 12 if the teacher feels that it can be adapted and used. Also, there is no rule which ways that a unit cannot be torn apart and used as separate parts or in different ways. This unit is a tool or a building block. The teacher is the designer or engineer.

The unit is divided into sections for convenience. White pages speak to the teacher, yellow pages are student materials.

Read this unit understanding the writers' intention that very little of this material should be told to students; they should come to know it by doing.

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INTRODUCTION

Many kindergarten children are able to make relationships by the use of symbols, even when they are unable to explain the relationship in words. However, they are often not able to recognize any tangible relationships between a symbol and an event. They are not yet aware that there are some sets of universal rules which make certain events predictable. It is hoped that through this unit of study, children will become aware of the associations between a symbol and an event in order to predict an appropriate outcome.

To do this the skills of reasoning and observation have been stressed. Experimentation is used only to the point where, hopefully, the children will realize that it is necessary to pay close attention to procedure in order to make valid predictions.

BACKGROUND INFORMATION

For a child, the world is full of things to see and wonder about. The smallest objects can arouse a child's curiosity and keep him intrigued. But do most children really look at something or do they just "see" it? Children must be instructed in the skill of observation.

If children are given appropriate experiences, the skills of observation can be developed. Once these skills are enhanced; then relationships between observations can be made. Thus, the children become more than curious. They are able to make associations based on instructive learning activities.

In this unit the children are asked to do more than just observe. They are asked to carry each observation one step further into predictions or relationships. The activities are designed to provide the children with experiences in comparing and contrasting, duplicating structures and predicting outcomes.

Special attention should be paid to the supplement that goes with the kindergarten through Grade 3 units. In it are suggestions for a classroom zoo and a classroom garden. It is hoped that, very early in the year, activities will be selected and set up in the

classroom. Since children are especially intrigued by living things, first-hand daily experiences with plants and animals will be of great value. The children can make daily observations and predict changes they may see as the year goes on. They should be encouraged to make associations from the relationships they observe. The classroom can serve as an ideal place for children to watch and wonder - a place where the beginning of an ecological point of view might develop.

DUPLICATING STRUCTURES

MATERIALS LIST

Building toys - wooden blocks, boxes, lincoln logs, plastic boxes, for each child.

PROCEDURE

DUPLICATING STRUCTURES

If results are to be accurately predicted and a task duplicated, then close consideration and attention must be paid to the steps taken in the performance of the initial task. This activity requires the children to pay close attention to the associations involved in various events. They are asked to create structures, observe the methods and procedures and then recreate the structures. By doing this, they become aware of clues and relationships which enable them to make more accurate predictions.

Duplicating A Structure

Using building toys such as wooden blocks, boxes, "lincoln logs" or plastic blocks, the children are asked to build "something." (An announcement prior to the activity could be made to have the children bring building toys from home.) They might build towers, buildings, rocket ships or any structures they desire. When each child has made a structure he is pleased with, have him try to build many different things. Finally, ask them to pick their favorite creations and build them again, exactly like the first time. Discuss the degree of success with the children. Were they able to repeat the task? Why? Why not?

If the children were not successful, it is hoped you will encourage the children through discussion to determine the importance of following procedure and discovering a plan.

Duplicating a Structure with a Special Requirement

On the following day, explain to the children that they are going to build something that stands tall, and it will require a stable base. Caution them to pay close attention to the way they build their forms, because they will have to construct them again, exactly like the first time. Continue to encourage the children to pay attention to their procedures throughout the working period. Dismantle the structures and put the blocks aside. Engage them in some other daily activity. Twenty to thirty minutes later return to the blocks. Can the children recreate the structures they made earlier? Ask them how close attention to the initial building process helped them repeat the forms. What did they remember about the stability of the base? Could they build as tall a structure without a stable base?

Duplicating a Structure Using a Model

Once again direct the children to create structures that are more unusual than any they have constructed before. Remind them to pay attention to how they build these structures. Suggest that Once the initial forms are constructed the children should let them stand and attempt to create duplicates next to them.

Did they have more success this time? Did the original models help them to construct copies? Discuss with the children anything

that helped them construct the copies. Can they build duplicates if they dismantle the originals? Can they communicate to a neighbor the method of building their structures? Try it. How important is it to pay close attention to their initial building processes?

Duplicating a Structure Using a Small Model

Instruct the children to construct small, simple structures. Maybe these will only be boxes or tables or some such simple constructions. Letting the small structures stand, ask them to make the longest possible replicas of their small models. Do they "look like" the small ones when they've finished? Do they have the same proportions? Did the small model help in the construction of the replica? Could they build a large replica without the small model?

DUPLICATING COLORS

MATERIALS LIST

5 or more baby food jars or plastic cups per student

1 medicine dropper or plastic straw per student

Spoons or popsicle sticks

Small bottles of food coloring

Pails or buckets

White paper

Optional: plastic aprons or sheets

PROCEDURE

DUPLICATING COLORS

The idea that things are predictable becomes apparent to the children in this activity. Predictions can be facilitated if procedures are recorded. The possibility of creating and duplicating the creation is the essence of this activity.

Prior to this activity, several preparations will be necessary. Ask each child to bring five or six baby food jars or plastic cups to class. If possible, a medicine dropper for each container of basic colored solution should be provided. An excellent plastic medicine dropper can be obtained from vitamin liquids for infants. Perhaps children could bring these to class. Demonstrate how to use the dropper. Plastic straws will also work; however, the children must be taught how to use the straw as a dropper. Demonstrate that they should put the straw in the liquid, then put a finger over the top end. Keeping their fingers in place, they take the straws out of the liquid and release drops by rocking their fingers slightly to one side.

Other materials which will be needed are: Spoons or popsicle sticks for mixing, plastic aprons or sheets of plastic

to protect clothing, if desired, and small bottles of food coloring. Groups can share the colors but not the mixing jars.

Dark colors of food coloring (blue, red, green) should be diluted with water to make mixing of clear colors easier. It is suggested that the teacher pretest the solution and decide whether to use the concentrate or the dilute solution.

Each group should begin experimenting with two colors.

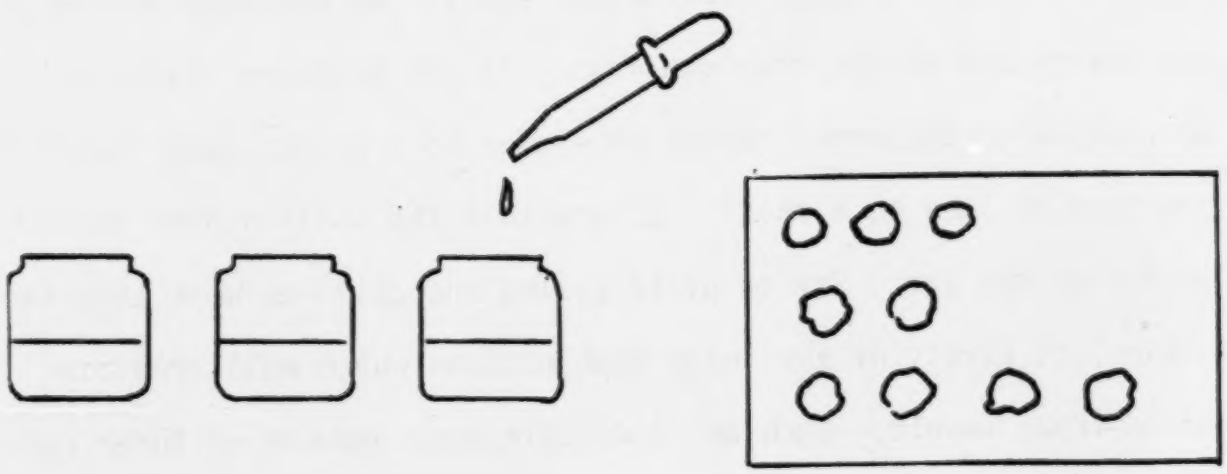
Tell each student to fill one empty jar half full of water. If buckets of clean water are spread around the room the class can just dip the jars. Empty buckets should be available for dirty water.

Provide each child with several containers of unmixed food coloring and ask the children to mix their colored solutions, a drop at a time, in any order or amount they wish. Mention that they use only drops of liquid, so that they can make more mixtures of the colored solution. As the children mix, they will begin to see new colors. Encourage them to see how many different colors and shades they can make. As the children discover new colors or different depths or shades of a color, have them put them in jars on a shelf. If possible the child's name should be put on the jar. Try to avoid giving the children more than two colors, at first, or any color combinations which will create a muddy brown result, such as, indiscriminate amounts of three colors from most brands of food colorings. It tends to limit the challenge of getting just the right number of drops for a colorful effect.

Once the students have mixed all the colors they can from their two colored solutions, have them pick two or three of their mixtures they like best and put them aside for the following day.

For the second day's activities, set the room up in the same manner and have children obtain their samples from the previous day. Can they duplicate them? Can they duplicate the mixing steps involved in making the colors? Discuss the success with the students. What problems did they have? Seek out any realizations or suggestions that performance could be more predictable if they had paid attention to their procedures. What if they had counted the drops they used the previous day?

Provide each child with a clean sheet of paper. Have the children make a color they like with the food coloring and for each drop of color added to the jar of water they can put a corresponding dot of color on the paper.



When a child has a color combination he likes, he will have the formula for that color combination on his paper. Set the colors and paper aside on a table.

Can the child mix this color the next day using his formula? Why? How did the formula help? How did the making and using of the formula create a need for paying close attention to the procedure?

Can the color combination be predicted by looking at the formulas? Does it matter what order the drops are put in? Have them try it. Does the size of the drop make a difference? Have them experiment.

FISH RESPONSES

MATERIALS LIST

1 guppy per child, plus 5 or more extra

Mayonnaise or quart jars

4-5 boxes of pelletized fish food

2 one-gallon food jars

PROCEDURE

FISH RESPONSES

In this activity students become familiar with the general behavior of guppies. They should be helped to notice simple (sometimes obvious) relationships such as eating and feeding, activity and use of space. On the basis of this observation, predictions can be made for the care of the guppies, alone and in groups.

For this activity it is necessary that the teacher obtain enough guppies so that each child, or, at most, each team of two children, will have one guppy. Have about five extra guppies for various set-ups around the room. It may be possible to obtain some of these from the children who have fish at home.

Mayonnaise or other quart-sized jars will be needed to keep the fish. Several boxes of fish food must also be provided. Try to get "pelletized" fish food. One pellet can be given for food each day and over-feeding easily avoided.

Assign one fish to each child. Put names on the jars so they will know their own fish. Explain that the children must take care of their guppies by feeding them once a day. The children should observe their fish for several days.

Using two one-gallon containers (food jars from the cafeteria), put two guppies in one and three guppies in the other. Place these on a table in the room. Encourage the children to watch these containers during the day.

After approximately five days, discuss with the children the things they have observed. Extend these observations into associations by asking: When does the fish eat? How do you know it is eating? Does it sleep? How do you know it is sleeping? Does it sleep in the dark? If we shut the lights off, will the fish go to sleep? How old is your fish? Does it talk? What does your fish do during the day?

Is your fish a male fish or a female fish? How do you know? Do guppies have babies? How do you know? What do the babies look like? (If babies are born, you might want to buy a small amount of nitella [a water plant] to add to the container for them to hide in.

Children might want to paint or draw a picture of their fish to aid in describing their features to the class.

Following their observations of the fish, what have the children noticed about the containers with two and three fish? What things do they see happening in these containers that are not happening in their containers? Do they eat at the same time? Do they swim together?

Discuss with the children what would happen if several children put their guppies together? Based on what the children know

about their fish, what needs would several fish have? Discuss the size of container, food, amount of water. If the children decide to combine their fish, encourage them to make predictions as to what might happen: Will there be enough room? Discuss the possibilities of babies. Will the fish fight? How will you recognize your fish? How much food will be needed?

According to their predictions, make arrangements for children to combine their fish. As the children observe these combinations for approximately five days, discuss the accuracy of their predictions. What new things have they seen happening? What predictions can they make now?

MAGNETS

MATERIALS LIST

1 or 2 magnets per child

(alnico magnets available from Edmund Scientific Supply Company, 300 Edcorp Building, Barrington, New Jersey, 08007)

An assortment of : nails, paper clips, lima beans, thumb tacks, buttons, pins, etc.

PROCEDURE

MAGNETS

Magnetism holds an aura of magic for five-year olds. In this activity they are asked to observe the "magic" of a magnet as it is related to common things. In doing this, they will identify the common characteristic of all the various objects which are attracted to the magnets or which become magnetized and then act like the magnet.

Provide one or two magnets for each child. Small inexpensive magnets may be purchased at a variety store. Small alnico magnets can be purchased from Edmund Scientific Supply Company, New Jersey. It may be possible that there are enough magnets within the science resources of your school. It will also be necessary to have such items as nails, paper clips, common pins, buttons, thumb tacks and lima beans for children to use in experimenting with the magnets.

The children should be allowed to play with the magnets and these objects for several periods. They may wish to try the magnet on other objects. As questions evolve, encourage the children to find answers. Have them try out their ideas. Do they work? If not, try again.

Following several periods of investigation, discuss the observations made by the children. Can they recognize the property of magnetic objects? How many magnetic objects can each child find around the room? How many magnetic objects can each child find outdoors? Is there a difference in the numbers? Why?

On the basis of their experiences, can children predict the behavior of other objects to the magnets? Can they pick out any general characteristics which are common to objects which do or do not respond to the magnet? Children can discuss these characteristics and judge among themselves the correctness of the choices. If there are any differences of opinion, students should test out the ideas.

COMPARING NUMBERS OF BOYS AND GIRLS

MATERIALS LIST

Construction paper for 50 squares and 50 circles

Chart paper

Paste

PROCEDURE

COMPARING NUMBERS OF BOYS AND GIRLS

Associations between numbers of boys and girls is the focus of this activity. Since children of this age are fascinated by numbers, their findings and predictions should be exciting to them. The children will count the number of boys and girls in their class, in another class and among their brothers and sisters. They will then predict the ratio of girls and boys in various other realms that they are familiar with.

Prior to this activity, the teacher must cut approximately 50 squares and 50 circles out of construction paper. (The teacher may choose to use a flannel board.) Large chart paper should be available for recording the findings of the class.

With the children, count the number of boys in the class and then the number of girls.

Record the findings by pasting on the chart the number of circles corresponding to the numbers of boys and the number of squares corresponding to the numbers of girls. (See illustration.)

Have a team or small group of children count the number of boys and girls in another class and record their findings in a similar manner.

Ask how many of the children in another class have brothers. How many have sisters? Enter these totals on the chart.

Examine the findings with the class. Where were there more boys than girls? Where were there more girls than boys? Can they see any relationships between their findings? Ask the children to predict how many boys and how many girls they will find in the following cases:

family doctors
teachers
mailmen
janitors
bus drivers
cooks in the school cafeteria

Tabulations of school personnel can be made by sending small groups around the school to count. Other cases can be tabulated by asking each individual student about their doctor, mailman, etc. Record all findings on a chart as previously done.

OUR CLASS	BOYS ○○○○○○○○
	GIRLS □□□□□□□□
ANOTHER CLASS	BOYS ○○○○○○○○○○
	GIRLS □□□□□□□□
BROTHERS AND SISTERS	BOYS ○○○○○○○○
	GIRLS □□□□□□□
DOCTORS	BOYS ○○○○○○○○○○○
	GIRLS □□□□
TEACHERS	

Discuss with the class the accuracy of their predictions. What associations can they make based on their findings. Were any results surprising?

OTHER SUGGESTIONS

If the teacher wishes to carry out further activities involving the recognition of associations, the following suggestions may be used. Follow the same procedure as in the preceding activities, observe, discuss relationships, predict, test, look at results.

1. Use plants which are sensitive to the touch. These may be purchased in the spring from a floral or garden shop. "Punch and grow" products have sensitive plants available in the spring.
2. In the winter use tracks in the snow to make predictions. Animal tracks, human tracks, tire tracks, etc. make interesting studies.
3. Squirrel watching or insect watching provide many associations to be recognized.
4. The falling of leaves, acorns or seed pods can be observed and predictions made.
5. Perhaps gathered seeds could be planted in the classroom and predictions tested as to the plant or tree which will result.

NATURE HUNT

MATERIALS LIST

5 to 6 items per child from a natural area

1 coffee can per group

1 clear plastic bag per group

Tag board flash cards

PROCEDURE

NATURE HUNT

Nature Hunt is an activity in which the children use the skills of observation, comparison and classification. The children will analyze various items as to their properties. They will use any association they make and experience they have in hunting for objects to predict where these items can be found on a second trip.

Prior to the first lesson, the following teacher preparation with the students is necessary:

1. Select a natural area near the school to which children can hike or which requires only a short bus ride. This area could be a vacant lot, park or a small field or woodlot.

2. Collect items at this area for the class to use as samples of their nature hunt. Enough items should be collected so that each group of three children will have five or six items which they will look for on the trip. Collect only items that will not damage living things and that are readily apparent, since these children are not

skilled in keen observation as yet. Items, such as dead leaves, weeds, seeds and seed pods, rocks, acorns, pine cones, pine needles, rotting wood, leaves which have fallen to the ground and fallen bark, will provide for an interesting variety. It is not necessary for each group to have the same items.

3. The sample items should be carried in a coffee can. The items the children collect will be carried home in plastic bags. Provide enough of these containers to go around.

4. Have some blank flash cards available for later class discussions.

To initiate the activity, place samples of each item on a tray or table. Pass several items among the students. Encourage the children to look closely at the items and be ready to tell you as much as they can about them. Perhaps individual children could tell about the item that they are holding. Children will be most anxious to tell what the object is rather than the characteristics. They have not been trained to really look at anything.

Discuss the five senses that humans possess and how they help tell more about an object than just its name. Isolate each sense; for example, "feel." Discuss how we feel an object and what it feels like. As the children give you adjectives, write them on a

flash card. Ask for an example of each word from the items the children are holding. Place these on display around the room. Examples of such words might be: rough, smooth, fuzzy, sharp, sticky, bumpy, etc. Continue with the senses of smell, hear and see. Continue to display adjectives and items. Discuss the use of taste as another classification. Is this a good way to observe an item? Why might we say no to tasting?

Here is a chance for some math "set" activities. Sets and sub-sets could be made with the items.

The following day, discuss the objects again with the students. Explain that they will be going on a hunt to find objects that are similar to these sample items.

Perhaps it will be necessary to introduce the concept of like and similar. Select man-made items that are <u>exactly</u> alike -- blocks, rulers, coffee cans, etc. Point out their exact likenesses. Select two blades of grass, two leaves, two rocks, two pieces of bark and point out their similarities. It is exceedingly difficult to locate two blades of grass, two leaves, two twigs, two rocks that are exactly alike. We call them "similar," meaning the same kind, from the same plant, of the same color or texture. You can be very exact in looking for similarities - two leaves are from the same kind of tree; or you can be very lax in looking for similarities - any two leaves.

Suggest that, through careful examination of the sample items, we might find some clues that will help us find similar objects outdoors.

What clues can you find by examining the sample items? For example, if wet and muddy, it is found near water; bark is found on a tree, etc. Do they help you predict where you will look? What things would you look for outdoors that give you a clue that this object might be present? Hold up several items and discuss various characteristics. What aspects such as color, kind, shape, might you try to match when outdoors?

Divide the children into groups of two or three and give each group a coffee can and plastic bag. The containers should contain five or six items. Explain to the groups that they should take out each item and examine it closely for clues. Tell them that they will be going to the area where these items were originally collected. They should discuss with their group where they might go to find items which are similar to those in their container. (A second activity might be to take them to a different area to find similar items once their skills of observation have developed.)

That same day or the following day, take the children to the natural study area. It will be helpful if there are several parents or other adults along for assistance. The helpers should be instructed not to help the child find objects. If aid is needed, they may assist by asking the child to look closely for clues on the sample object.

Set up boundaries for the class, such as four trees (perhaps they could be flagged). Children will attempt to match the contents of their container with similar items found within the area. Explain that they should count how many items they can find.

After the trip the children will want to share the experiences with the rest of the class. How well did they find the location of the object? How many things could they find? What problems did they have? How did the clues from the sample objects help? How similar to the sample were the objects that they found? Which kind of items were hardest to find? Easiest?

OTHER SUGGESTIONS

The following are some examples of more complex samples involving greater observation. The activities develop the power of making associations.

1. Animal Prints - Make copies of animal prints. The children will locate and match up their print drawings with the prints they find.

2. Items from the Pond - Fill plastic sandwich bags containing small amounts of mud from bottom of pond. Select, with discretion, other items from the pond which can be easily replaced or are abundant and won't be missed. For example, gravel, stones, or water plants might be used, if their removal won't deplete the contents of the pond.

3. Plantings - Remove some leaves from plantings in the area. Place each in a separate sandwich bag. The plantings might include lilac, dogwood, honeysuckle, wild plum and wild crab.

If any of the plantings are budding or flowering, remove some buds and flowers and put them in separate plastic bags.

4. Soils - You can probably find two kinds of soil in the study area. Prepare sample sandwich bags of each kind of soil you can locate in the area.

5. Feely Cards - Prepare "feely" cards containing the following words:

fuzzy	squeezy
crispy	fluffy
prickly	rough
bumpy	smooth

The children can locate one item that feels like the word; for example, a snail shell might be "smooth," a dandelion head, "fluffy," a bur, "prickly." Each feely card should have a box for checking when an item that fits the "feel" is located.

OUTDOOR FIELD TRIPS

Outdoor field trips are enjoyable and interesting. They provide a "vehicle" to make a learning experience "fun" for students.

In this unit outdoor activities are used to develop children's ability to recognize associations. These trips may be as simple and easy as a ten-minute spontaneous visit to the playground to investigate a specific aspect of the outdoors, such as sun and shade or the effect of many feet on plants. On the other hand, the trips may become long and extensively planned.

If the trips are adequately planned and the children properly motivated, they can be beneficial experiences. This section contains many suggestions to help you get maximum benefit from your field trips.

A loosely structured field trip is especially appropriate for kindergarteners. Associations can be made by motivating them to watch, wonder and question.

Some trips are more complex than others, but all require some degree of planning. The first consideration is to pick a field trip site that provides for what you want the children to see or do. The closer it is and the easier it is to get to, the better. Is there room for your thirty active children? Are

there problems of access? Will the children be able to see? You should obtain permission in advance if you plan to take your class into a private area. Visit the site yourself first in order to have the best control of the situation and anticipate some of the difficulties or questions that could arise. Examine the area carefully. This one step can make the difference between a successful and a chaotic trip.

You will find that the school yard is the easiest place to go on a field trip. You and the children will be surprised at how many things you will find that have gone unnoticed until then.

You should know what you want the children to look for before you start out, even if it is stated only in the most general terms. Discuss the purpose of the trip with the class beforehand. If the children dont know what to look for, they will become bored and restless quickly. If they are absorbed in a problem they may maintain interest for a long time.

Take as little equipment as possible along with you. What you decide to take depends on the purpose of the trip. You may want the children to have pencils and notepads. Pieces of yarn can serve as markers for interesting discoveries. Magnifiers might be very useful, but you risk loss. If you want magnifiers, take as few as you can and put each one in the specific care of a responsible child. If you intend to collect specimens, you will need appropriate containers, such as plastic bags. You may also want to carry a camera.

Before the trip, have the children join you in deciding on a set of rules. Try to keep the rules "do" rather than "do not." They should include most of the following:

1. Always keep the teacher in sight.
2. Try to leave the place as you find it. Replace anything you move. Avoid stepping on plants whenever possible.
3. Be quiet and move slowly so that you do not disturb the creatures that live there.
4. When you find something interesting, tie a piece of yarn near it to help you find it again when you want to show it to the rest of the class.
5. When you hear the whistle, gather around the teacher.

If you teach in an area where there are poisonous snakes or insects, be sure that the children know how to recognize the poisonous species. They should also be warned that they are to avoid picking up any animal about which they are in doubt.

The field trip may lay the ground-work for activities you will want to do in the classroom. Collect only such things as are absolutely necessary for the follow-up, because it is important that the children learn good conservation habits. The basic rule is to leave a natural habitat undisturbed. If an animal is caught and observed, it should then be put back where it was found - allowed to "go home."

The teacher's role becomes very important if the field trip is to be more than a sight-seeing expedition. Turning observations into meaningful relationships will be facilitated by the types of questions the teacher asks the children. In the previous activities, the children have been able to see the results of their predictions; however, on a field trip, they may never know where the fly is going or what the bee is going to do. Nevertheless, these are the kinds of associations that the children should be asked to make. They are asked to put together what they observe, to wonder and to predict beyond what is readily in sight.

These types of field trips are usually open-ended. The children may want to return to an area to check on a particular question that interests them. A continuing investigation and observation helps children to improve their methods.

The following is a list of possible outdoor trips and suggested questions that arouse and sustain curiosity. The children might be asked these questions on an individual basis outdoors, or they might share their observations with the whole class, and then the teacher may ask these questions:

(1) Observations while lying on your stomach

Tell the students to find a place in a designated outdoor area that is their very own. They should not be able to touch anyone else. They should be within sight of the teacher. The children should lie on their stomachs and imagine they are a giant spying on a mini-world.

They should observe everything they can. Remind them to be very quiet and as still as possible.

Depending on their observations the following questions may apply.

- Where does the ant live? How does it find its way? When you followed the ant with your eyes, did you see anything on its head that moved as the ant walked along? How deep was the ant's nest? Where did they get the sand to build their hill?

- What other insects did you see? Where do they live? What were they doing? Where were they going?

- What things did you see that are growing?

- What things were dead? How did you know?

- Did you notice anything unusual about the leaves you found? Who might have been eating them?

- Did you see different kinds of gravel and dirt? Why did some feel wet?

(2) Observations while lying on your back

Using the same area and the same procedure as above tell the children to lie on their backs and make as many observations as they can.

After their observations, ask them the following:

- What trees did they see? Describe the leaves.

- What does the sky look like? What makes clouds?

- Where was the bird flying? Could you see his nest? Did he have anything in his mouth?

- Did you see a nest in a tree? Why is this a good place for a nest?

- What patterns do the wires make? Is this a pretty design? Why do birds sit on the wires? What are the birds doing while sitting on the wires?

(3) Adopt a tree

In an outdoor area each child should pick a tree to watch and observe. Several children may select the same tree if there are not enough for each individual student. The children should visit their trees periodically. They should draw a picture of their trees each time they return to observe them. Perhaps the teacher could help the children make a simple map for quick location of their trees.

Make leaf rubbings by putting newsprint over an interesting leaf and rubbing over the newsprint with the fat side of a crayon.

Paint pictures of animals that live in the trees.

Record the seasonal changes of the trees by painting or drawing pictures on each visit.

Examine the cracks, holes and the area near the roots. What things might live in these areas? Why must a squirrel be able to walk or run up and down a tree? Follow the squirrel quietly. What does it do? Where is it going?

Examine the trees for new leaves developing. What protects the buds? What does the bark protect? Why is bark a good hiding place for insects?

Describe what things you see at the base of the tree. Are they related to the tree itself?

(4) Observing in a Vacant Lot

How many different kinds of insects can you find? What is the bee doing? Where will it go? How does the spider protect itself? Where does the daddy long-legs live? Watch it to find out.

Why are there so many kinds of weeds? How do their seeds travel?

(5) Observing in a School Yard

Sidewalks, gutters, puddles, fences and cracks near the building provide interesting observations on the school yard.

- Why do plants lean away from the building? Where does the light come from?

- How many animals can you find in the school yard? Where do these animals live?

- Where does the water come from in the puddle? How long will it last?

- Which side of the building is warmest?

- How does the tree get enough water to grow? Where are the roots? How did the tree get started?

- How can this weed grow between the cracks? Where are the roots?

- Where does the rainwater go? Can you trace the paths of water after a rain?

- How many kinds of plants can you find in your school yard?

SUGGESTED BOOK LIST

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